

Wind tunnel AER stats

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Get wind tunnel data only.

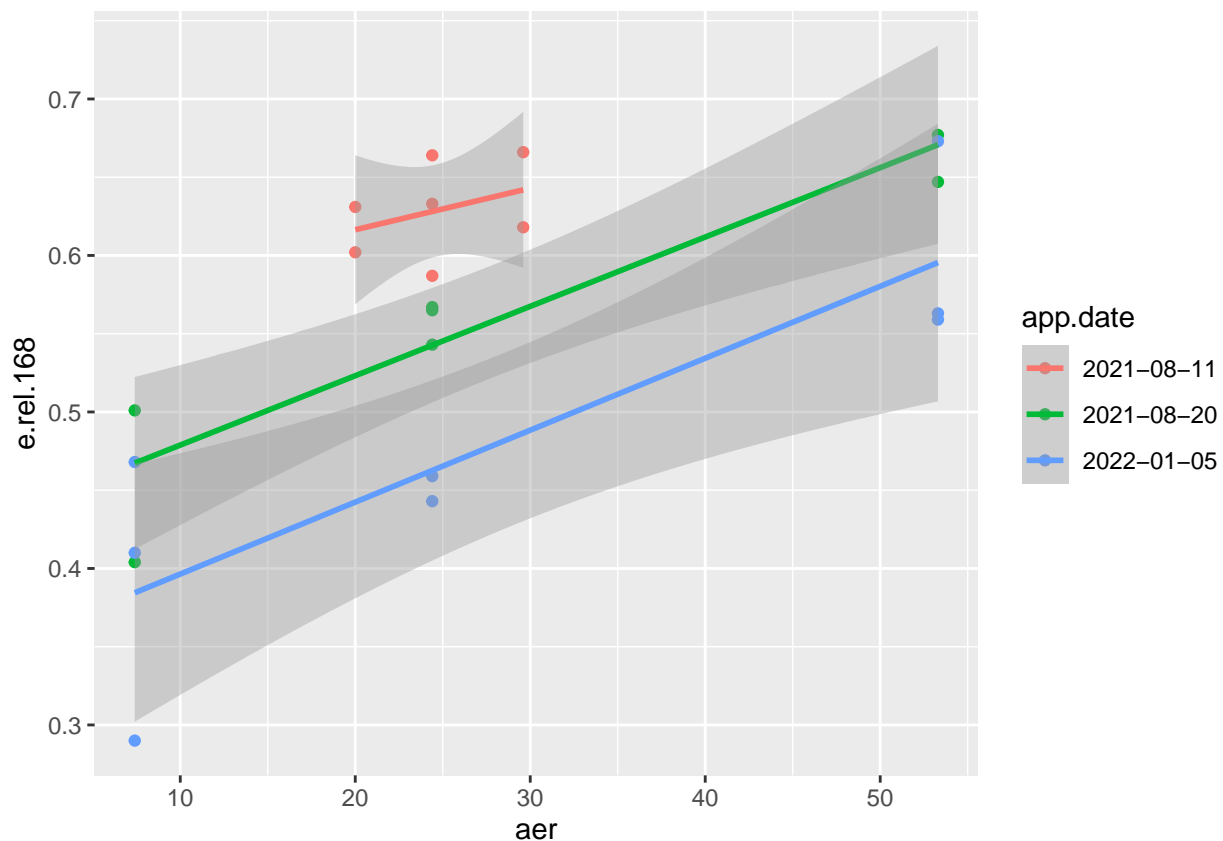
```
wsumm <- subset(isumm, meas.tech == 'Wind tunnel')
dfsumm(as.data.frame(wsumm))
```

```
##
## 22 rows and 22 columns
## 22 unique rows
##
##           app.date      pmid  meas.tech meas.tech2      aer
## Class           character integer   character   character numeric
## Minimum      2021-08-11    1904 Wind tunnel          wt      7.4
## Maximum      2022-01-05    1925 Wind tunnel          wt     53.3
## Mean          <NA>        <NA>        <NA>        <NA>     27.2
## Unique (excl. NA)      3      22          1          1      5
## Missing values      0      0          0          0      0
## Sorted          TRUE      TRUE          TRUE          TRUE  FALSE
##
##           aer.grp      cta air.temp.mean air.temp.min
## Class           factor numeric      numeric      numeric
## Minimum      Low 7 or 20    181          2.46        -3.4
## Maximum      High 30 or 54   211          15.4         11.4
## Mean          Medium 25     193          10.5         4.93
## Unique (excl. NA)      3      3          6          6
## Missing values      0      0          0          0
## Sorted          FALSE      FALSE          FALSE          FALSE
##
##           air.temp.max wind.2m.mean wind.2m.min wind.2m.max rain.cum
## Class           numeric      numeric      numeric      numeric numeric
## Minimum          8.5          0.1          0.1          0.1      0
## Maximum          22.3          0.72          0.72          0.72  0
## Mean             17.1          0.367          0.367          0.367  0
## Unique (excl. NA)      6          5          5          5      1
## Missing values      0          0          0          0      0
## Sorted          FALSE      FALSE          FALSE          FALSE  TRUE
##
##           rain.cum.48 j.NH3.mean j.NH3.min j.NH3.max e.cum.final
## Class           numeric      numeric      numeric      numeric numeric
## Minimum          0          0.0928          0          0.524     19.6
## Maximum          0          0.264          0.0375          4.31     47.7
## Mean             0          0.198          0.00741          2.67     37.8
## Unique (excl. NA)      1          21          12          22      22
## Missing values      0          0          0          0      0
## Sorted          TRUE      FALSE          FALSE          FALSE  FALSE
```

```
##
##           e.rel.final e.cum.168 e.rel.168
## Class           numeric      numeric      numeric
## Minimum           0.317         17.9         0.29
## Maximum           0.711         47.4         0.677
## Mean              0.568         36.9         0.553
## Unique (excl. NA)      21          20          22
## Missing values         0           0           0
## Sorted             FALSE        FALSE        FALSE
##
```

```
ggplot(wsumm, aes(aer, e.rel.168, colour = app.date)) +
  geom_point() + geom_smooth(method = lm)
```

```
## `geom_smooth()` using formula 'y ~ x'
```



```
m1 <- lm(e.rel.168 ~ aer + factor(app.date), data = wsumm)
summary(m1)
```

```
##
## Call:
## lm(formula = e.rel.168 ~ aer + factor(app.date), data = wsumm)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.096571 -0.028905  0.002575  0.023349  0.081429
##
## Coefficients:
```

```
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)      0.5179174  0.0228705  22.646 1.12e-14 ***
## aer              0.0044987  0.0006138   7.330 8.33e-07 ***
## factor(app.date)2021-08-20 -0.0852673  0.0243495  -3.502 0.00255 **
## factor(app.date)2022-01-05 -0.1646365  0.0236440  -6.963 1.67e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.04541 on 18 degrees of freedom
## Multiple R-squared:  0.8367, Adjusted R-squared:  0.8094
## F-statistic: 30.73 on 3 and 18 DF,  p-value: 2.693e-07
```

```
anova(m1)
```

```
## Analysis of Variance Table
##
## Response: e.rel.168
##               Df    Sum Sq Mean Sq F value    Pr(>F)
## aer              1 0.090101  0.090101  43.699 3.308e-06 ***
## factor(app.date)  2 0.100012  0.050006  24.253 7.794e-06 ***
## Residuals        18 0.037114  0.002062
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
confint(m1)
```

```
##               2.5 %      97.5 %
## (Intercept)      0.469868343  0.565966479
## aer              0.003209222  0.005788204
## factor(app.date)2021-08-20 -0.136423659 -0.034111035
## factor(app.date)2022-01-05 -0.214310816 -0.114962215
```

```
drop1(m1, test = 'F')
```

```
## Single term deletions
##
## Model:
## e.rel.168 ~ aer + factor(app.date)
##               Df Sum of Sq    RSS    AIC F value    Pr(>F)
## <none>                0.037114 -132.47
## aer                   1  0.11077 0.147884 -104.05  53.723 8.328e-07 ***
## factor(app.date)     2  0.10001 0.137126 -107.71  24.253 7.794e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
m2 <- lm(e.rel.168 ~ aer * factor(app.date), data = wsumm)
summary(m2)
```

```
##
## Call:
## lm(formula = e.rel.168 ~ aer * factor(app.date), data = wsumm)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.094460 -0.023873  0.002623  0.024283  0.083540
##
## Coefficients:
```

```
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)      0.563260   0.124115   4.538 0.000336 ***
## aer              0.002658   0.004985   0.533 0.601309
## factor(app.date)2021-08-20 -0.128738   0.128654  -1.001 0.331889
## factor(app.date)2022-01-05 -0.212819   0.127622  -1.668 0.114850
## aer:factor(app.date)2021-08-20 0.001774   0.005091   0.348 0.732062
## aer:factor(app.date)2022-01-05 0.001939   0.005057   0.384 0.706366
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.04793 on 16 degrees of freedom
## Multiple R-squared:  0.8382, Adjusted R-squared:  0.7877
## F-statistic: 16.58 on 5 and 16 DF,  p-value: 7.859e-06
```

```
anova(m2)
```

```
## Analysis of Variance Table
##
## Response: e.rel.168
##               Df    Sum Sq Mean Sq F value    Pr(>F)
## aer              1  0.090101  0.090101  39.2176 1.133e-05 ***
## factor(app.date)  2  0.100012  0.050006  21.7658 2.723e-05 ***
## aer:factor(app.date) 2  0.000354  0.000177   0.0771   0.9261
## Residuals       16  0.036760  0.002297
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
confint(m2)
```

```
##               2.5 %      97.5 %
## (Intercept)      0.300148471 0.82637230
## aer              -0.007911136 0.01322642
## factor(app.date)2021-08-20 -0.401473027 0.14399651
## factor(app.date)2022-01-05 -0.483365141 0.05772695
## aer:factor(app.date)2021-08-20 -0.009018049 0.01256551
## aer:factor(app.date)2022-01-05 -0.008780254 0.01265917
```

```
drop1(m2, test = 'F')
```

```
## Single term deletions
##
## Model:
## e.rel.168 ~ aer * factor(app.date)
##               Df Sum of Sq    RSS    AIC F value Pr(>F)
## <none>                0.036760 -128.68
## aer:factor(app.date)  2 0.00035424 0.037114 -132.47   0.0771 0.9261
```